

CLAIMS

1. Voltage excursion protection apparatus for an integrated circuit embedded in I/O section, comprising:

an I/O section including at least one output driver; and,
a pre-driver section for establishing the state of said at least one output driver, said pre-driver section including a voltage excursion event detection circuit effective to detect an undesirable voltage excursion and to establish said at least one output driver into a predetermined event protective state when said undesirable voltage excursion is detected.

2. The voltage excursion protection apparatus as claimed in claim 1 wherein said at least one output driver is a low-side driver.

3. The voltage excursion protection apparatus as claimed in claim 1 wherein said at least one output driver is a high-side driver.

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4. The voltage excursion protection apparatus as claimed in claim 1 wherein the voltage excursion event detection circuit includes a diode string referenced against a predetermined point in the integrated circuit.
5. The voltage excursion protection apparatus as claimed in claim 2 wherein the voltage excursion event detection circuit includes a diode string referenced against a predetermined point in the integrated circuit.
6. The voltage excursion protection apparatus as claimed in claim 3 wherein the voltage excursion event detection circuit includes a diode string referenced against a predetermined point in the integrated circuit.
7. The voltage excursion protection apparatus as claimed in any one of claims 1 through 6 wherein said I/O section further includes at least one dummy transistor.

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8. The voltage excursion protection apparatus as claimed in any one of claims 4, 5, or 6 wherein the diode string is referenced against one of Vcc and Vss of the I/O section.

9. The voltage excursion protection apparatus as claimed in claim 7 wherein the diode string is referenced against one of Vcc and Vss of the I/O section.

10. Method for protecting an integrated circuit having an I/O section including at least one output driver against voltage excursions, comprising:

monitoring a voltage at a predetermined point in the integrated circuit;

establishing said at least one output driver into a predetermined protective state when said voltage at said predetermined point deviates from a predetermined voltage.

11. The method for protecting an integrated circuit as claimed in claim 10 wherein said at least one output driver is a MOSFET and establishing said at least one output driver into a predetermined protective state comprises establishing said MOSFET into an off state.

12. The method for protecting an integrated circuit as claimed in claim 10 wherein said at least one output driver is a low-side N-type MOSFET and establishing said at least one output driver into a predetermined protective state comprises establishing said low-side N-type MOSFET into a grounded gate state.

13. The method for protecting an integrated circuit as claimed in claim 10 wherein said at least one output driver is a high-side P-type MOSFET and establishing said at least one output driver into a predetermined protective state comprises establishing said high-side P-type MOSFET into a voltage-tied gate state.

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14. Voltage excursion protection apparatus for an integrated circuit embedded in I/O section, comprising:

an I/O section including a pair of complementary MOSFET drivers; and,

a pre-driver section for establishing the state of at least one of said pair of complementary MOSFET drivers, said pre-driver section including a voltage excursion event detection circuit effective to detect an undesirable voltage excursion and to establish said at least one of said pair of complementary MOSFET drivers into an off state when said undesirable voltage excursion is detected.

15. The voltage excursion protection apparatus as claimed in any one of claims 14 wherein the voltage excursion event detection circuit includes a diode string referenced against a predetermined point in the integrated circuit.

16. The voltage excursion protection apparatus as claimed in claim 14 wherein said I/O section further includes at least one pair of dummy complementary MOSFETs.

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17. The voltage excursion protection apparatus as claimed in claim 15 wherein said I/O section further includes at least one pair of dummy complementary MOSFETs.

18. The voltage excursion protection apparatus as claimed in any one of claims claim 15 through 17 wherein the diode string is referenced against one of Vcc and Vss of the I/O section.